The Kingdom of Saudi Arabia
Ministry of Health

Synopsis of the National Protocol for the Management of Asthma.
Pocket Guide
The National Scientefic Committee of Bronchial As.

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The National Scientific Committee of Bronchial Asthma would like to express their grateful thanks and gratitude to all the anticipants and current members who actively contributed to the National Bronchial Asthma Program.

Merck Sharp Dohme (Riyadh) deserves special words of thanks for their assistance and active support in publication of this synopsis.

May Allah bless your efforts and rewards on all of us abundantly.

Index

Preface

The Kingdom of Saudi Arabia spares no effort to establish a permanent systematic health development process to all its citizens, besides providing them with related well-being. Therefore, the Government of The Custodian of the Two Holy Mosques was keen to focus primarily on setting up a group of mechanisms with a view to improving and implementing an adequate range of comprehensive health services programs through the Ministry of Health and other related health institutions.

As a result, the Ministry of health has adopted so many health policies and programs, which the formation of the "Diagnosis and Management of Bronchial Asthma is one of them. It seems to be one of the most common diseases spreaded today, especially among children in Saudi Arabia.

The National Scientific Committee Of Bronchial Asthma has always played a dominant role in supporting health care teams in Saudi Arabia at this level. They could translate their strategies into specific plans of actions represented in brining about a unified protocol for the diagnosis and management of asthma, besides participating increasingly in formulating national awareness program on such disease for physicians, patients, patients families in particular and for public education in general.

To this end, this booklet / manual, the latest publication lying in front of you, is a further step in implementing

this strategy. It has been designed with respect to size and format of writing in order that it may be handy to be carried in one's pocket.

The 3rd edition of this protocol was published three years ago with the purpose of keeping abreast of current changes and developments. This 4th edition is now being issued under the title of "Synopsis of the National Protocol for the Management of Asthma". This is to include an updated

information, data and other notions that have developed through application and reviews, as well as making use of the recent international contributions and experiences on the management of bronchial asthma.

This booklet should serve as a scientific evidence based medicine and a guide to healthcare providers in various disciplines that care for asthmatic patients in Saudi Arabia, besides being an asset to GCC health care teams and institutions.

To continue with the program, the Ministry of Health has led the National Campaign throughout the country at governmental and non-governmental organizations levels as an endeavor to emphasize on the need of optimizing and disseminating the concept of finding continuous quality improvement on asthma management.

Much appreciation is sincerely addressed to the National Scientific Committee staff on Bronchial Asthma for their efforts made to produce this manual in such a suitable size to be one the desk of every physician and health care provider, thereby dealing with asthmatic patients in appropriate way.

Specially thanks are due to all previous and existing committee members, the professionals and physicians who have provided constructive criticism and remarks, and to all other colleagues who have contributed to bringing this achievement into light.

May all of us pray to Allah, Almighty for more success.

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1. Introduction

This pocket guide is a concise and updated version of the National Protocol For The Management Of Asthma. It is designed to be a quick and practical guide for physicians in the field and not intended to serve as a substitute for National Protocol, which should be consulted for more details. Areas that have had material change from the previous realease of the National Protocol pertain to the classification of asthma in children, doses of inhaled steroids, and the more established roles of long acting B2 agonists and leukotriene modifiers. Asthma is a major problem in Saudi Arabia. Studies show that the prevalence of Asthma in Saudi Arabia has risen from 8% in 1986 to 25% in 2001.

Definition Of Asthma

Asthma is a chronic inflammatory disorder of the airway associated with widespread but variable airflow limitation (partly reversible with or without treatment) and with increased airway hyperresponsiveness to variety of stimuli.

Pathophysiology

Acute Changes

In response to triggers, mediators are released, followed by recruitment of inflammatory cells resulting in bronchoconstriction that is rapidly reversible by β_2 agonists. Airflow limitation occurring over 6-24 hours may require steroids for more effective relief.

Symptoms of cough and wheezing develop during this period.

Chronic changes

Some may not be reversible, and usually are a result of recurrent acute attacks. It is characterized by hypertrophy of the smooth muscles, thickening of the basement membranes and collagen deposition (airway remodeling). Mucous plugging and necrosis of the respiratory epithelium may be seen in severe asthmatics, stressing the importance of using anti-inflammatory agents.

2. Diagnosis Of Asthma

History

- Recurrent difficulty in breathing, wheezing and cough.
- Cough may be the only presenting symptom.
- Reversible airflow limitation and diurnal variation of peak expiratory flow rate (PEF) by more than 20%.
- Symptoms occur or worsen at night, with activity, upper respiratory infections, change in weather or exposure to allergens, tobacco smoke or pollutants.
- Exclusion of diseases that mimic asthma like cardiac causes, foreign body inhalation, gastro esophageal reflux and drug induced cough (β–blockers and ACE inhibitors).
- History of Smoking.

Examination

- Nose and throat for evidence of upper respiratory tract infection, allergy and nasal polyps.
- Skin for atopy.
- Pulse, temperature, use of accessory muscles.
- Chest deformity, ronchi, and prolonged expiration phase.
- PEF is an important tool for quantitation of airflow obstruction, and ongoing monitoring.

Investigations

- Chest x-ray in the initial diagnosis of bronchial asthma, in cases not responding to specific treatment and when suspecting complications.

- Spirometry before and after bronchodilators may be required in some patients.
- Total IgE, specific IgE, and skin testing in very selected patients where environmental controls may be applicable.
- Bronchial challenge test only done with doubtful diagnosis of asthma (done in tertiary care center).

Related conditions:

Allergic rhinitis - often co-exists with asthma and may result in chronic cough because of postnasal drip, nasal blockage and nasosino hyper responsiveness. Early diagnosis and treatment is important for better control of asthma.

Gastroesophageal reflux (GER) - may precipitate acute attacks of asthma especially at night with the presence of heartburn. GER needs high index of suspicion and appropriate treatment.

3. Long-Term Management Of Asthma

Aims

- Optimize therapy with minor or no adverse effect from medications.
- Minimal (ideally no) chronic symptoms, including nocturnal symptoms.
- Infrequent exacerbations (ideally none).
- Minimal need for PRN β_2 -agonist medications (ideally none).
- No limitation on activities, including exercise
- PEF variability <15%.
- Almost normal PEF.

Asthma therapy is directed at controlling and not curing asthma. The degree to which therapy changes the natural history of asthma is controversial, non-the less, evidence seems to indicate that early use of inhaled steroids may reduce airway remodeling and irreversible airway obstruction. Asthma itself may improve, especially in children so therapy may be significantly reduced or completely stopped at one stage. This is not the case for most adults where therapy may need to be maintained for life in some.

Partnership between the healthcare providers and the patient in asthma therapy is essential so that most patients would actively participate in managing their asthma.

Important Points In Managing Asthma

- Avoiding triggers.
- Education.
- Pharmacotherapy.
- Action plans.
- Managing coexisting conditions such as rhinitis, sinusitis and GE reflux.

Pharmacological Therapy

The choice of medications and doses used should be in accordance with the classification of asthma based on severity. The following diagrams summarize the classification scheme and the medications to be used for each grade of severity or step. Note that if the patient is already on medications, the amount of medications needed to control the asthma should be taken into account in the process of classification.

Stepwise Approach (Children)

Classification Based on Severity

Classification*	Intermittent	Mild Persistent	Moderate Persistent	Severe Persistent
Minor Symptoms**	< 1 / week	1-3 / Week	4-5 / Week	Continuous
Exacerbations/Nocturnal ***	< 1 / Month	1 / Month	2-3 / Month	> 4 / Month
PEF Between Attacks	> 80 %	> 80 %	60-80 %	< 60 %
Pharmacological Therapy	**Step 1**	**Step 2**	**Step 3**	**Step 4**

* The presence of only one parameter in the more severe classification step is enough to have that patient classified into that group.

** Minor symptoms are mild, last for less than an hour and are easily relieved by β_2 agonists.

*** Exacerbations usually last for more than a day and may not respond easily to β_2 agonists.

Stepwise Approach (Adults)

Classification Based on Severity

Classification*	Intermittent	Mild Persistent	Moderate Persistent	Severe Persistent
Minor Symptoms**	< 2 / week	2-3 / Week	4-5 / Week	Continuous
Exacerbations/Nocturnal ***	< 2 / Month	2-3 / Month	4-5 / Month	> 5 / Month
PEF Between Attacks	> 80 %	> 80 %	60-80 %	< 60 %
Pharmacological Therapy	**Step 1**	**Step 2**	**Step 3**	**Step 4**

* The presence of only one parameter in the more severe calssificaiton is enough to have that patient classified into that group

** Minor symptoms are mild, last for less than an hour and are easily relieved by β_2 agonists

*** Exacerbations usually last for more than a day and may not respond easily to β_2 agonists

Pharmacological Therapy (Children)

Pharmacological Therapy	Step 1	Step 2	Step 3	Step 4
PRN β_2 Agonists				
Inhaled steroids 100 - 400 mcg/day*				
Inhaled steroids 400 - 800 mcg/day*				
Inhaled steroids > 800 mcg/day*				
Long Acting β_2 Agonists**				
Leukotriene Inhibitors**				
Slow Release Theophylline**				
Oral steroids				

* Doses are based on Beclomethasone and Budesonide, half the dose would be used for Fluticasone

** These medications are optional for that step, should be individualized and used in addition to inhaled steroids.

* These symptoms are mild, last for less than an hour and easily relieved by B2 agonists

** Doses are based on Beclomethasone and Budesonide, half the dose mentioned above would be used for Fluticasone

*** These medications are optional for that step, should be individualized and used in addition to inhaled steroids

Pharmacological Therapy (Adults)

Pharmacological Therapy	Step 1	Step 2	Step 3	Step 4
PRN β_2 Agonists				
Inhaled steroids 200 - 600 mcg/day*				
Inhaled steroids 600 - 1200 mcg/day*				
Inhaled steroids > 1200 mcg/day*				
Long Acting β_2 Agonists**				
Leukotriene Inhibitors**				
Ipratropium Bromide**				
Slow Release Theophylline**				
Oral steroids				

* Doses are based on Beclomethasone and Budesonide, half the dose would be used for Fluticasone.

** These medications are optional for that step, should be individualized and used in addition to inhaled steroid.

Action plan

Provide a verbal or written action plan in severe cases so that patients recognize deterioration and respond appropriately.

Follow-up and Referral

Initial Phase

In this phase the diagnosis is established and it lasts until the asthma is under control. Important aspects of this phase include:

- Starting asthma medications.
- Educating the patient about asthma and the medications.
- PEF in moderate and severe cases should be measured daily in the morning and in the evening, until normal for that patient is established.
- Patients are seen every 2-4 weeks.

Second Phase

In this phase the asthma should be under control and the patient understands the basics of asthma and medications, during this phase:

- PEF is measured less frequently perhaps on 2-3 days a week in the morning and the evening and when needed.
- Patients should have and action plan (written or verbal).
- Patients are seen about every 3-6 months.
- There would be minor adjustments of medications when needed.

Duration of anti-inflammatory therapy:

There is no limit for the duration of anti-inflammatory therapy, 6 months or even longer in perennial asthma. Therapy may need to be carefully adjusted based on the patient's response, exacerbations and seasonal variation.

Adjusting the dose of anti-inflammatory therapy:

Attempts should be made to step down therapy to the least dose that would control the symptoms. This may be achieved by gradually reducing the dose in a stepwise fashion after symptoms have been controlled for at least 3 months.

Referrals

Primary health care centers

These may initially see asthma of all grades of severity for which therapy is to be initiated. Moderate and severe asthma is to be referred to secondary and tertiary care centers while intermittent and mild persistent would be followed at the primary care center. Some mild persistent asthmatics may be referred to confirm the diagnosis.

Primary health care centers will mostly manage mild intermittent and mild persistent asthma and refer moderate and severe asthma after initiating therapy.

Secondary care centers

These will be involved in managing mild and moderate persistent asthmatics, confirming the diagnosis, and ruling out other conditions that may mimic or coexist with asthma.

Tertiary care centers

These will manage all severe persistent asthmatics and some of the complicated moderate asthmatics especially in the initial phase. Examples of conditions found at tertiary care centers:

- A life-threatening acute asthma attack (cyanosis, silent chest and paradoxical chest movement).
- Poor self- management ability requiring intensive education.

- Uncertain diagnosis.
- Poor response to regular therapy.
- Unacceptable side effects from medications.
- Frequent courses of oral Corticosteroids.
- Requirement for inhaled steroids greater than 1600 mcg/day for adult and 800 mcg/day for children.
- Occupational asthma.
- Severe persistent asthma.

4. Management Of Acute Asthma Attacks

Home Management Of Acute Asthma

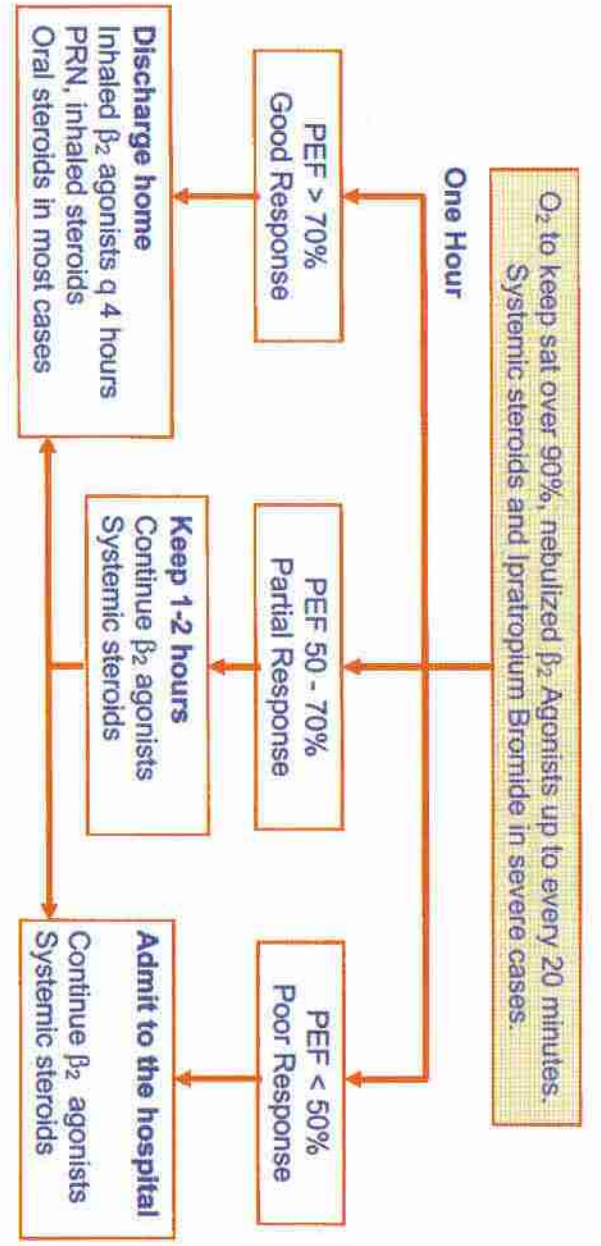
When an acute exacerbation is expected the following should be considered, preferably in accordance with an action plan:

- Start β_2 agonists, preferably via a spacer device, up to 4- hour intervals.
- Double dose of inhaled corticosteroids for 1-2 weeks.
- It is strongly recommended that instructions, i.e., an action plan, be given to the patient and/or family on how to manage acute exacerbations based on symptoms and PEF and when to proceed to the emergency room or obtain professional medical advice.

Emergency Room Management Of Acute Asthmatic Attacks

Assess severity of asthmatic attack

	Mild	Moderate	Severe
Color	Good	Pale	Possibly cyanotic
Speaks in	Sentences	Phrases	Words
Consciousness	Not affected	Not affected	Affected
Auscultation	End expiratory wheeze	Inspiratory and expiratory wheeze	Breath sounds becoming inaudible
Physical exhaustion	No	No	Yes may have paradoxical chest wall movement
Pulse/min (Adults)	<100	100-120	>120
Respiratory Rate (Adults)	Increased	Increased	>30/min
Pulsus Paradoxus	<10	10-20	>20
PEF(%predicted)	>60%	40-60%	< 40%
O2 Saturation	> 95%	90-95%	< 90%
Arterial PO2	Not necessary	> 60 mm Hg	< 60 mm Hg
Arterial PCO2	Not necessary	> 40 mm Hg	> 40 mm Hg



Use Of Medications In Acute Asthmatic Attacks Children

Salbutamol (albuterol)/terbutaline:

A. Nebulizer: 2.5-5mg in 2.5-5cc saline. (0.15 mg/ kg/ dose).

B. Inhaler: 2-4 puffs (200-400 mcg) via spacer. A or B may be repeated up to every 20 minutes in the emergency room or up to every 4 hours at home.

Steroids:

IV hydrocortisone: 5-10 mg/kg initially, then 2.5-5 mg/kg/dose every 6-8 hours.or

IV methylprednisolone: 1-2 mg/kg initially, then 0.5-1 mg/kg/dose every 6-8 hours.or

PO prednisolone: a daily dose of 1-2 mg/kg (maximum 40 mg) is usually given for 3-5 days.

Use Of Medications In Acute Asthmatic Attacks Adults

Treatment	Mild	Moderate	Severe*
Admission	Probably not	Probably Yes	consider ICU
Oxygen	High flow of at 6- 8 L/min to achieve an inspired oxygen concentration of about 50%. Monitor effect by oximetry		
Nebulized * salbutamol	1 ml	2 ml every 1-4 hours	2 ml 15-30 mins.
Nebulized Ipratropium	Not necessary	Optional	Yes
Corticosteroid	Consider Oral	Give oral or consider IV	Give IV
Theophylline			May consider
Adrenaline (1:1000, 0.3-0.5ml SC) **only for anaphylaxis or severe asthma not responding to above**			
Chest X-ray	Not necessary Unless focal signs present		May be Necessary
Observations	Regular	Continuous	Continuous

* See next table for more details on the management of severe asthmatic attacks.

** 0.5% (5 mg/ml) solution to be mixed with saline to make 4ml and 8L/min of O_2.

Management Of Severe Asthmatic Attacks In Adults

Treatment	Severe
Admission	consider ICU
Arterial Blood Gases	
Oxygen	High flow of at least 8 L/min to achieve an inspired oxygen concentration of about 50%. Monitor effect by oximetry
Nebulized salbutamol with 6-8 L/min O_2	2 ml 0.5% salbutamol + 2 ml saline every 15-30 mins. Give IV when no response to aerosol, e.g., salbutamol 250 mcg IV bolus and then 10 mcg/kg/hr.
Nebulized Ipratropium	2 ml 0.025% ipratropium with β_2-agonist every 2 hours
Corticosteroids	Give IV Hydrocortisone 200 mg stat. + q 6 or Methylprednisolone 120 mg stat + 60 mg q 6 hourly
Adrenaline (1:1000, 0.3-0.5ml SC) **only for anaphylaxis or severe asthma not responding to above**	
Chest X-ray	Necessary if no response to initial therapy or if pneumothorax is suspected
Observations	Continuous

The initial daily dose of prednisone 40 mg orally is to be tapered over a 7-10 day period.

MANAGEMENT OF SEVERE ASTHMATIC ATTACK IN CHILDREN

Admission	Consider ICU
Arterial blood Gases	
Oxygen	To achieve 0_2 Saturation ≥ 90%
Nebulized Salbutamol	2.5 – 5 mg (0.15 mg/kg/dose)
Steroids	IV hydrocortisone 5-10 mg/kg initially, then 0.5 – 1 mg/kg/dose every 6-8 hours.
Aminophylline	Loading dose 6m/kg IV over 20 min (provided oral theophylline was not taken within 24 hrs.) Maintenance 1mg/kg/hr. mcg/ml levels should be checked, aiming at 10-15.
Chest X-ray	If no response to initial therapy or if pneumothorax is suspected.
Observations	

Hospital Management

Criteria For Admission

- No response to β_2-agonist or PEF, that does not improve to at least 70% of personal best following three hours of intensive therapy in the emergency room.
- β_2-agonist more frequently than every four hours.
- Past history of acute life-threatening asthma.
- PEF less than 50% of personal best after the first hour of intensive therapy in the emergency room.
- Social factors that may interfere with asthma care.

ICU Admission

If despite aggressive emergency room therapy the patient still has:

- PCO_2 more than 45 mmHg.
- PO_2 less than 60 mmHg.
- PEF less than 30%.

Management On The Ward

- Oxygen, keep saturation between 90-95% when pulse oxymetry available.
- β_2 agonists every 2-4 hours on the wards more frequently in the intensive care unit.
- Iv or oral steroids.
- Ipratropium bromide in severe cases.
- Educate patients about asthma and how to use medications.

Discharge From Hospital

- PEF or FEV_1 between 60-70% of best value 4 hours after β_2-agonists, patient can remain comfortable more than 4 hours after the β_2-agonist.
- Continue oral steroids for at least 3 days after discharge, possibly longer in severe asthmatics, the usual starting dose is 1-2 mg/kg/day in children up to 40 mg po of prednisone in adults.
- Clear plan for treatment that includes maintenanceinhaled steroids and follow-up.

5. Medications

Anti-inflammatory Therapy

This is the most important modality in the treatment of asthma.

Sodium cromoglycate (intal): an anti-inflammatory medication that is less potent than inhaled steroids and takes much longer for a significant effect to be seen.

Beclomethasone (Becotide, Viarex), budesonide (Pulmicort) and fluticasone (Flixotide): Inhaled steroids are the corner stone of asthma management. They are very effective anti-inflammatory agents and intended for regular long-term use. Side effects are uncommon and do not usually interfere with therapy. These are reduced by using spacer devices (with metered dose inhalers) and washing the mouth after use. Side effects include oral thrush and hoarseness. Concerns have been raised about suppression of hypothalamic pituitary axis and possible effect on growth in children; the clinical significance of these is questionable and controversial. There is evidence however that doses up to 400 mcg/day of beclomethasone and budesonide and 200 mcg/per day of fluticasone do not have any significant effect on growth and do not influence ultimate height. Fluticasone is twice as potent as the other inhaled steroids and is used at half the doses.

Leukotriene-receptor antagonists (LTRAs) can be considered as an alternative to increasing doses of inhaled steroids particularly if allergic rhinitis coexists. LRTAs may also be used as adjunct therapy to inhaled steroids to achieve control of persistent asthma or reduce the total dose of inhaled steroids. LRTAs should not be used as first-line anti-inflammatory therapy and cannot completely replace inhaled steroids.

Bronchodilators

Salbutamol/Albuterol (Ventolin) and Terbutaline (Brecanyl): These are best used by inhalation on intermittent basis for relief of acute episodes. They are also the drug of choice for exercise-induced asthma. Onset of action is within minutes of administration, and effects last for four to six hours. Common side effects include tachycardia and tremors, and could be reduced by using spacer devices or reducing the dose. Recommended dose is 200 mcg via inhaler or 500 mcg via turbohaler every four to six hours as needed or 2.5 to 5 mg via nebulizer. In infants and younger children a dose of 0.15 mg/kg/dose up to a maximum of 5 mg could be used via nebulizer. In certain situations, the dose may need to be given more frequently (e.g., in the emergency room). Regular need of more than every four hours requires professional medical attention.

Salmeterol (Serevent) and formoterol (Oxis) are long-acting β_2-agonists with effects lasting around 12 hours. They are used in addition to inhaled steroids on regular basis if asthma control is not adequate. They also seem to be helpful in nocturnal asthma. They should not be used for relief of acute symptoms or without regular inhaled steroids.

Ipratropium bromide (Atrovent): this is an anticholinergic agent that has additive bronchodilator effect when used with β_2-agonists. It is useful in severe acute asthma at doses of 250 to 500 mcg via nebulizer every 4 to 8 hours in addition to β_2-agonists. It is also useful in the continuous care of some adults, and the dose is 40 mcg 3-4 times per day, in addition to inhaled steroids.

Methylxanthines can be considered in severe acute asthma when there is incomplete responsiveness to optimal doses of bronchodilator and steroids. Long-term slow-release theophylline can be used in the management of severe asthma in addition to anti-inflammatory medications, provided levels are followed regularly. A level of 5-15 mg/ml should be targeted and doses adjusted accordingly.

Combination therapies e.g:

Seretide (flixotide and salmeterol), Symbicort (budesonide and formoterol): These combinations are more cost efficient because they cost less than the equivalent medications separately and potentially improve compliance since patients would have to use one instead of two inhalers.

Methods of delivering inhaled therapy

Metered dose inhaler (MDI): most children will be unable to use this without a spacer device.

Dry powder: for example, rotahaler, turbohaler, diskhaler, spinhaler, and diskus. Most children over 5 years and adults would be able to use these directly.

Spacers: these are devices that improve the delivery of medications from an MDI, reduce their systemic absorption and local side effects. Should be used in conjunction with MDI in all children and in adults using high-dose inhaled steroids.

Nebulizers: are most helpful for patients under 2 years of age and those having difficulty with other delivery systems.

Other Treatments

Ketotifen, depot steroids, antibiotics, antihistamines, mucolytics and antitussives have no established role in asthma therapy.

6. Patient Education

Objectives

- Improving knowledge of asthma.
- Changing attitude and behavior.
- Improving management skills.
- Improving satisfaction.

Elements of patient education

Basic Facts About Asthma:

- Asthma is a chronic inflammatory disease.
- Extended and regular use of inhaled anti-inflammatory agents is the cornerstone of asthma therapy.
- In most asthma patients, the objectives of asthma therapy are achievable including a normal life style with no restriction of activities or sports.

Cultural Misbeliefs

- Inhalers used in asthma therapy are not addictive.
- Inhaled steroids have minimal side effects if any and are always better than uncontrolled asthma.
- Asthma is not contageous.

Asthma Medications

- The techniques for using inhaled medications.
- When to adjust or start certain medications.
- Potential side effects of medications.
- The advantages of inhaled medications over systemic medications.

How to use a metered dose inhaler

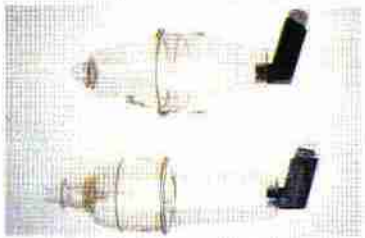
- Remove the cap and shakethe inhaler.
- Breath out gently.
- Put the mouthpiece in the mouth, and at the start of a slow and deep inspiration, press the canister down and continue to inhale deeply.
- Hold breath for 10 seconds.
- Wait about 30 seconds before taking another inhalation.

Spacers with Mask

- Remove the cap, shake the inhaler, and insert into the device.
- Place the mask on the mouth and nose and make sure that there is a good seal.

- Press the canister once to release a dose of the drug.
- Wait for the child to breathe at least six times or for 30 seconds.
- Remove the device from the mouth.
- Wait about 30 seconds before a second dose is taken.

A Spacer With A Mouth Piece



- Remove the cap, shake the inhaler, and insert into the device, breathout gently.
- Place the mouthpiece in the mouth.
- Press the canister once to release a dose of the drug.
- Take a deep slow breathe in.
- Hold the breath for about 10 seconds, and then breathe out through the mouthpiece.
- Breathe in again but don't press the canister.
- Remove the device from the mouth.
- Wait about 30 seconds before a second dose is taken.

The Turbohaler

- Unscrew and lift off the white cover. Hold turbohaler upright and twist grip anti-clockwise and clockwise as far as it will go (you will hear a click).
- Breathe out gently, put mouthpiece between the lips, and breathe in as deeply as possible.
- Remove turbohaler from the mouth and hold breath for about 10 seconds.

The Diskus

- Note the number of inhalations left that appears in the dose counter
- Place thumb on the thumb rest and push open until you hear a click keeping diskus in horizental position
- Slide lever back until you hear a click.
- Breathe out away from Diskus Seal lips around mouthpiece then breathe in deeply and forcefully then remove from the mouth.
- Hold breath for about 10 seconds then breathe out.

Peak Expiratory Flow (PEF)

Adult Males

Age	Height	PEF
25	160	590
25	175	620
25	190	640
60	160	550
60	175	580
60	190	600

Adult Females

Age	Height	PEF
25	152	475
25	160	485
25	175	505
60	152	420
60	160	430
60	175	450

Children

Age	Height	PEF
5	110	150
7	120	200
8.5	130	250
10	140	310
12	150	360
14	160	420

MINI PEAK FLOW METER

ASSORTED INHALER DEVICES

SPACERS DEVICES

Avoiding Asthma Triggering Factors

Nonspecific Irritants

- Active and passive smoking, strong odors, paint, sprays

Indoor Allergens

House Dust Mites

The following measures should be applied whenever exposure to mite is playing a role in triggering asthma, asthma is poorly controlled or significant medications are required:

- Encasing mattresses, box springs and pillows in airtight material.
- Washing blankets and bedlinen once a week in hot water to kill mites.
- Bedroom carpet should be removed or covered by polyethylene sheeting.
- Remove stuffed toys.

Animals: Furred or feathered animals should be taken out from house.

Cockroaches: cleaning and application of pesticides when the patient is not around.

Molds: Cleaning and avoiding humidity help reduce fungal spores.

Outdoor Allergens

Pollens and fungi are difficult to avoid, but exposure can be reduced in sensitive patients by remaining indoors and the use of air conditioning and avoiding areas where pollen and mold counts are high.

Self-Management

Written action plans especially in moderate and severe asthma could be useful. Patients should be knowledgeable in how to objectively monitor asthma using PEF or symptom scorecards.

Action Plans

An action plan should enable the patient to:

1. Recognize deterioration by:

- Increasing symptoms, especially waking at night with asthma.
- Need for increasingly frequent doses of bronchodilators.
- Failure of bronchodilator to relieve symptoms.
- Falling peak flow and/or increasing peak flow variability.

2. Respond appropriately

Based on the action plan, patients should know when and how to:

- Use short acting β_2 agonists.
- Adjust dose of regular medications.
- Call or visit the clinic.
- Go to the ER.

Examples of Personalized Crisis Plan For Management Of Asthma

Guide to management of asthma for regular medications

- Before exercise:
  Inhale (_____) 15 minutes before
- Mild coughing, wheezing, shortness of breath, PEF reduced by 10-30%:
  Get away from possible cause (smoke, dust, animal, pollen)
  Inhale bronchodilator (_____) every 4 hours.
- For more severe symptoms, PEF reduced by 30 to 50%:
  Inhale (_____) every 20 minutes for 1 hour if necessary.
  If unimproved,
  Continue (_____) every 2 hours
  Increase your dose of inhaled steroid to (_____)
  Contact physician at (_____)
  Start oral prednisolone (_____) once daily for (_____) days
- For very severe symptoms, struggling to breathe or gray lips or fingernails, difficulty walking or talking, chest and neck retractions in with each breath, PEF reduced by 50% or more:
  Inhale (_____) every 20 minutes
  Go immediately to physician or emergency room.

Holidays

- Ensure that the child has a sufficient supply of his medications.
- Parents must be aware of the names of the drugs and the strength of the preparation the child is using.
- Some patients may need 1 or 2 coursed of oral steroids to be taken as standby and used of needed.
- A practitioner of nearby hospital should be identified.

تم بحمد الله وفضله

واخر دعوانا أن الحمد لله رب العالمين

Our First and Last Invocation is that all Praise is to Allah the Lord of the Worlds